

REMARKS

This AMENDMENT UNDER 37 CFR 1.114 accompanies a request for continued examination and also responds to the Office Action of January 29, 2004, and is believed to place this case in condition for allowance for reasons set forth below in greater detail.

Responsive to paragraph 4 of the Office Action, reconsideration is respectfully requested of the rejection of Claims 1, 2, 16, 17 and 19 in paragraph 4 on the basis that “a plurality of second data blocks having second embedding data” is not supported by the original specification.

In fact, “second embedding data” is explicitly supported by the original specification and claims (see original claim 1, last line, original claim 2, last two lines, etc.), and by including that term in a parenthetical explanation of the original claim and specification language.

Taking original Claim 1, lines 10-16, as exemplary, the original claim language specified “a data filling means for filling each of certain first embedding data to each of said divided first data blocks to generate a plurality of second data blocks, said detection apparatus, comprising: a data extracting means for extracting said embedding data filled in each of at least a part of said second data blocks”. The original claim language then added the parenthetical explanation “(second embedding data)”.

The added parenthetical explanation “second embedded data” refers in explanation to the embedding data filled in the second data blocks, as previously recited in the claim. Moreover, original claim 1, last line, referred to “said extracted second embedded data.”

The previous amendments to Claims 1, 2, 16, 17 and 19 merely eliminated the parenthetical explanations, which is not acceptable under 35 U.S.C. 112, and placed the terminology of the parenthetical explanations directly into the claims where it is first used,

namely, “a data filling means for filling each of certain embedding data to each of said divided first data blocks to generate a plurality of second data blocks having second embedding data”.

Accordingly, the term “second embedding data” is an explicit part of the original claims and specification, and the previous amendments to Claims 1, 2, 16, 17 and 19 merely moved “second embedding data” from the parenthetical explanation, which was cancelled, into the non-parenthetical main body of the claim, to eliminate the improper parenthetical explanation.

If the Examiner does not agree with the above explanation, it is respectfully requested that the Examiner consult with the Examiner’s Supervisor on this matter, as this rejection under 35 U.S.C. 112 is believed to be without any reasonable basis.

Reconsideration is respectfully requested of the rejection of claims 1-19 under 35 U.S.C. 102 as being allegedly anticipated by Bhaskaran, U.S. Patent No. 6,064,765, particularly in view of the following comments on the distinctions and advantages of the present invention relative to Bhaskaran.

The present invention and Bhaskaran both relate to fragile watermarking, and both can detect not only an alteration, but can also detect the alteration location.

However, the present invention and Bhaskaran are different in the following technical areas.

Bhaskaran embeds fragile watermarks only to the 63rd DCT (discrete cosine transformation) based on the hash value of the other DCT coefficients, changing the quantizer value of the coefficient to 1. In contrast thereto, the present invention embeds fragile watermarks by modifying the DCT transformation coefficients of the adjacent blocks in accordance with a predefined rule, e.g., the size relationship of the corresponding DCT coefficients. Also, the present invention doesn’t utilize a hash function at all.

The present invention not only detects the alteration location, but also can embed additional data (second embedding data) (e.g. 96bit to 1024x768 image), and this additional data can be detected even after an alteration and/or format conversion.

Also, the present invention has the following advantage regarding fragile watermarking when compared with Bhaskaran.

The present invention can detect the alteration location even after a format conversion and/or JPEG re-compression, as long as the size relationship of the adjacent blocks are maintained, whereas Bhaskaran cannot detect the alteration location after such a conversion/re-compression. So, Bhaskaran judges a pure format conversion as being “tampered”, while the present invention doesn’t judge a pure format conversion as being “tampered”.

Bhaskaran embeds fragile watermarks to the 63rd coefficient, which is relatively high frequency, and tends to degrade the fidelity, especially for plain images, while the present invention doesn’t substantially degrade the fidelity, because the present invention only modifies the size relationship of the DCT coefficients of the adjacent blocks, whose values are usually close and do not change very much to satisfy the predefined size relationship.

Bhaskaran changes the quantizer of the 63rd DCT to 1, which increases the file size of the JPEG compressed image. In contrast thereto, the present invention doesn’t change any quantizer values.

The Office Action concludes that Claim 1 is anticipated by Bhaskaran by the disclosure in the Abstract, Col. 2, lines 63-67, and Col. 3, lines 18-35, 67, and Col. 4, lines 1-17.

The concept of dividing images into a plurality of blocks are similar in both Bhaskaran and the present invention, but this concept is just preparation for embedding the watermark and does not reflect the novelty of the present invention. The present invention cannot only detect an alteration location, but can also embed data, which Bhaskaran cannot do.

The present invention possesses not only fragile watermark characteristics, but also robust watermark characteristics. Also, the “data filling means” adjusts a relationship between or among a mutually corresponding plurality of said unit; that is, for example, the size relationship of the corresponding DCT coefficients which is not anticipated by Bhaskaran.

In the context of Claim 1, the present invention includes “a data filling means for filling each of certain first embedding data to each of said divided first data blocks to generate a plurality of second data blocks having second embedding data, ... and an alteration detecting means for detecting whether or not alteration was added to each of at least a part of said second data blocks based on said extracted second embedding data, and an altered position indication means for indicating the positions occupied by said second image blocks of which added alteration was detected.

Bhaskaran does not disclose or anticipate, and is not capable of, this claim feature of embedding additional data (second embedding data), and detecting the positions occupied by the second image blocks having the second embedding data (second image blocks of which added alteration was detected).

The present patent application contains 8 independent claims which are related as follows.

Independent claim 1 is drawn to a contents alteration detection system (apparatus) having a data filling apparatus and a detection apparatus operating on “contents data.” The data filling apparatus comprises a contents data dividing means and a data filling means. The detection apparatus comprises a data extracting means, an alteration detection means and an altered position indication means.

Independent claim 2 is parallel to and substantially the same as independent claim 1, but operates on “image data” rather than “content data.”

Independent claim 9 is drawn to the data filling apparatus comprising the contents data dividing means and the data filling means, and the altered position indication means.

Independent claim 12 is drawn to just the detection apparatus comprising a data extracting means, an alteration detection means and an altered position indication means.

Independent claim 16 is a method counterpart of independent system claim 1.

Independent claim 17 is drawn to a recording medium having the system of claim 1 including the data filling apparatus and the detection apparatus, as recited in claim 1.

Independent claim 18 is drawn to a recording medium having the data filling apparatus of claim 9.

Independent claim 18 is drawn to a recording medium having the detection apparatus of claim 12.

All of the independent claims 1, 2, 9, 12 and 16-19 now specify the following two additional limitations.

1) The contents data (or the image data) is divided into a plurality of first data blocks, each first data block containing a plurality of unit data (see Figures 6A and 6B).

2) The data filling means fills embedded data to each of the divided first data block to generate second data blocks having second embedding data, the second data blocks having a modified relationship, relative to the first data blocks, between values of a corresponding plurality of said unit data in adjacent second data blocks according to a predefined rule.

Note that the second 2) limitation specifies that the second data blocks are modified relative to the first data blocks between values of a corresponding plurality of said unit data in adjacent second data blocks according to the predefined rule.

As noted above, the present invention distinguishes over Bhaskaran because "Bhaskaran embeds fragile watermarks only to the 63rd DCT (discrete cosine transformation) based on the hash value of the other DCT coefficients, changing the quantizer value of the coefficient to 1. In contrast thereto, the present invention embeds fragile watermarks by modifying the DCT transformation coefficients of the adjacent blocks in accordance with a predefined rule, e.g., the size relationship of the corresponding DCT coefficients. Accordingly, the above limitation relative to adjacent second data blocks definitively distinguishes over Bhaskaran.

This application is now believed to be in condition for allowance, and a Notice of Allowance is respectfully requested. If the Examiner believes a telephone conference might expedite prosecution of this case, it is respectfully requested that he call applicants' attorney at (516) 742-4343.

Respectfully submitted,



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